APPARATUS FOR RE-CODING AN IMAGE SIGNAL

This application is based on Application No. 2000-322469, filed in Japan on October 23, 2000, the contents of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

1 Field of the Invention

The present invention relates to an apparatus for re-coding an image signal in which, when an image signal once decoded after being coded is re-coded, coding deterioration can be minimized in re-coding even if coding parameters in the previous coding are not obtained.

2. Description of the Related Art

Various kinds of coding procedures for reducing an information amount of a digital image signal have been proposed, and a plurality of procedures have already been established as international standards   Among them, in the case where an image signal coded by a coding method (e.g., ITU-T recommendation H 261 or H.263, ISO/IEC standard MPEG, etc.) adopting a procedure of inter-frame predictive coding is edited in a coded bit stream, there are various constraints.   Therefore, an operation becomes easier if a coded image signal is edited after being once decoded into an image signal, followed by being re-coded.

However, if a coded image signal is re-coded after being decoded, generally, marked coding deterioration occurs

1

In order to avoid this, it is known that the same coding parameters as those used in the previous coding may be used for re-coding. Examples of coding parameters include a "picture type" representing predictive methods such as intra frame prediction (I-picture)/forward inter-frame prediction (P-picture)/bidirectional inter-frame prediction (B-picture), a "quantization step size" used for quantization processing, and a "motion vector" used for motion compensation prediction. Among them, the "picture type" has the largest effect on the quality of a re-coded image, which is an important parameter.

The above-mentioned parameters can be output together with a decoded image signal from a decoder for decoding a coded bit stream to an image signal. However, it is also assumed that the decoder does not have a function of outputting parameters, and only a decoded image signal is obtained due to the loss of output parameter data.

As a procedure for extracting parameters from a decoded image signal in the case where only a decoded image signal is obtained, for example, Japanese Patent Application Laid-open No. Hei 10-32829 discloses the following procedure.

FIG. 6 is a block diagram showing a configuration of a re-coding apparatus disclosed in Japanese Patent Application Laid-open No. Hei 10-32829.

In FIG. 6, reference numerals 10, 11, and 12 denote a pre-processing portion, a coding control portion, and a coding portion. The pre-processing portion 10 is composed of an intra frame coder 20, an SNR calculator 21, and an I-picture detector 22.

Hereinafter, an operation of the above-mentioned re-coding apparatus will be

2

described.

It is assumed that an input image signal 31 input to the re-coding apparatus is an image subjected to at least one coding processing, of which coded bit stream is decoded by a decoder (not shown). The intra frame coder 20 intra frame codes all the input image signals 31 using a fixed quantization step size, and outputs a bit stream 41. The SNR calculator 21 calculates an SNR value from the coded bit stream 41 and outputs an SNR value 42. The I-picture detector 22 detects the position of an I-picture from the SNR value 42. The coding control portion 11 uses the results detected by the I-picture detector 22 to output a control signal 32 for controlling coding processing of the coding portion 12. The coding portion 12 codes the input image signal 31 based on the control signal 32, and outputs a coded bit stream 33.

According to the above-described prior art, the SNR calculator 21 measures an SNR of an image signal. However, a procedure thereof is not particularly specified. In the apparatus configuration shown in FIG. 6, in order to measure an SNR in the SNR calculator 21, it is required that the input bit stream 41 is once decoded to obtain a decoded image signal, and calculation processing (in which sum of square differences is calculated in order to obtain an SNR) is conducted between the decoded image signal and the input image signal 31.

Furthermore, the intra frame coder 20 needs to output the bit stream 41. Therefore, in the case of using a coding method such as MPEG, at least a discrete cosine transform (DCT) unit, a quantizer, and a variable-length coder (VLC) are required.

3